AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently amended) A system for communicating information on a network having pieces of electronic equipment that connected to the network by cables having a plurality of wires therein, said system comprising:

a central module having at least one power source;

a first piece of equipment;

a first cable having wires therein connected between the central module and the first piece of equipment;

a first remote module utilized in conjunction with the central module to alter ~~the~~ a flow of current within at least a pair of wires in the first cable, the altered current flow communicating information about the first piece of equipment to the central module while the first piece of equipment is physically connected to the network via the first cable;

a second piece of equipment;

a second cable having wires therein connected between the central module and the second piece of equipment; and

a second remote module utilized in conjunction with the central module to alter ~~the~~ a flow of current within at least a pair of wires in the second cable, the altered current flow communicating information about the second piece of equipment to the central module

while the second piece of equipment is physically connected to the network via the second cable.

2. (Currently amended) The system of claim 1 wherein information communicated to the central module is over the same data wires in the cable that normally carry high frequency data communications over the network to a piece of ~~the~~ electronic equipment.

3. (Previously presented) The system of claim 1 wherein the information is a unique signal related to the piece of equipment to which each remote module is associated.

4. (Previously presented) The system of claim 3 wherein said central module further comprises:

a monitor for decoding the unique signal communicated over the cable thereby identifying the equipment associated therewith.

5. (Currently amended) The system of claim 1 wherein ~~the~~ at ~~least one~~ remote module is a device attached to -a piece of equipment.

6. (Currently amended) The system of claim 1 wherein the central module identifies the existence and location of a piece of ~~the~~ equipment even if ~~without power being applied to~~ the piece of equipment is powered off.

7. (Previously presented) The system of claim 1 wherein the central module further comprises a power modulator for modulating power from the power source and coupling a modulated power signal over the cables to the remote modules, and

wherein the remote module further comprises a power demodulator for demodulating the modulated power signal to detect information sent from the central module;

whereby the remote modules can operate on power from the central module without the electronic equipment being powered, and further that information can be bi-directionally transmitted between the central module and remote modules.

8. (Previously presented) The system of claim 1 wherein the central module detects the absence of a proper signal associated with a piece of equipment on the network and blocks network services from being delivered to that piece of equipment.

9. (Previously presented) The system of claim 1 which further comprises:

a database having information that identifies each piece of equipment and its location on the network, along with an identification signal for each piece of equipment; and

wherein the system periodically updates the database as a function of the communicated information to thereby track the identity and location of the equipment on the network.

10. (Currently amended) The system of claim 1 wherein the central module is used to limit access to selected programs as a function of the information communicated by at least one~~the~~ remote modules.

11. (Previously presented) The system of claim 2 wherein the information is in the form of multi-bit information and wherein the bit rate of the multi-bit information is less than about 1% of the bit-rate of the high frequency data communications.

12. (Currently amended) The system of claim 1 wherein the information can be communicated to the central module even if ~~the~~ a piece of electronic equipment is powered off.

13. (Previously presented) The system of claim 1 wherein the network is an Ethernet network.

14. (Previously presented) The system of claim 11 wherein the frequency of the high frequency data is at least 10 Mbits/sec and the bit rate of the multi-bit information is not more than 100 kb/sec.

15. (Currently amended) The system of claim 1 wherein the ~~first and second~~ cables are twisted pair Ethernet cables.

16. (Currently amended) A system for communicating information on a network, said system comprising:

a central module having at least one power source;

a first piece of equipment;

a first cable having a plurality of wires therein, at least a pair of wires in said first cable connecting the first piece of equipment to the central module through a first loop;

a first remote module connected to the first piece of equipment;

said first remote module including a transmitter utilized in transmitting first low-frequency multi-bit information to the central module over wires in the first cable without disturbing normal network high frequency data communication carried by wires in the first cable, said first remote module being utilized in conjunction with the central module to generate said first multi-bit information by altering ~~the~~ a flow of current in the first loop while the first piece of equipment is physically connected to the network via the first cable;

a second piece of equipment;

a second remote module connected to the second piece of equipment;

a second cable having a plurality of wires therein, at least a pair of wires in said second cable connecting the second piece of equipment to the central module through a second loop; said second remote module including a second transmitter utilized in transmitting second low-frequency multi-bit information to the central module over at least a pair of wires in the second cable without disturbing normal network high frequency data communication carried by wires in the second cable, said second remote module being utilized in conjunction with the central module to ~~generated~~ generate said second multi-bit

information by altering ~~the~~ a flow of current in the second loop while the second piece of equipment is physically connected to the network via the second cable; and

wherein said central module detects the multi-bit information transmitted over the first and second cables from the ~~firs~~ first and second pieces of equipment on the network.

17. (Previously presented) The system of claim 16 wherein:

the first transmitter is electrically coupled to the first loop and is utilized in modulating an electrical characteristic of the first loop to define the first low frequency multi-bit information associated with the first piece of equipment; and

the second transmitter is electrically coupled to the second loop and is utilized in modulating an electrical characteristic of the second loop to define the second low frequency multi-bit information associated with the second piece of equipment.

18. (Currently amended) The system of claim 16 wherein ~~at least one of the first and second~~ the cables are ~~is a~~ twisted pair Ethernet cables.

19. (New) The system of claim 1 wherein the altered current flow includes two or more changes in the current flow.

20. (New) The system of claim 1 wherein the current flow is a DC current flow and the altered current flow includes at least one change in the magnitude of the DC current flow.

21. (New) The system of claim 1 wherein a remote module includes a transmitter and the central module includes a receiver.

22. (New) The system of claim 1 wherein the current flows through a center-tap of at least one isolation transformer.

23. (New) The system of claim 1 wherein a remote module is integrated into a piece of equipment.

24. (New) The system of claim 23 wherein a remote module consists of one or more electrical components.

25. (New) The system of claim 1 wherein said central module is integrated into centralized network equipment.

26. (New) The system of claim 25 wherein the centralized network equipment is a hub.

27. (New) The system of claim 25 wherein the centralized network equipment is a patch panel.

28. (New) The system of claim 1 wherein the central module includes a second power source.

29. (New) The system of claim 1 wherein the information is utilized to selectively provide one or more electrical signals to one or more pieces of equipment.

30. (New) The system of claim 29 wherein at least one electrical signal is a DC current signal.

31. (New) The system of claim 1 wherein the wires within which the current flow is altered are the same wires used for normal network communication.

32. (New) The system of claim 1 wherein the number of wires within which the current flow is altered is four.

33. (New) The system of claim 1 wherein the information uniquely distinguishes a piece of equipment.

34. (New) The system of claim 1 wherein the information identifies an electronic attribute of a piece of equipment.

35. (New) The system of claim 1 wherein the information identifies a network attribute of a piece of equipment.

36. (New) The system of claim 1 wherein the information identifies a physical attribute of a piece of equipment.

37. (New) The system of claim 1 wherein the information identifies a physical configuration within a piece of equipment.

38. (New) The system of claim 1 wherein the information is utilized to distinguish between different pieces of equipment.

39. (New) The system of claim 1 wherein the information identifies one or more capabilities of a piece of equipment.

40. (New) The system of claim 1 wherein the information identifies the port location of a piece of equipment.

41. (New) The system of claim 1 wherein the information is utilized by a control circuit.

42. (New) The system of claim 1 wherein the information is utilized to provide a notification signal.

43. (New) The system of claim 1 wherein the central module interrogates a piece of equipment for one or more predetermined characteristics.

44. (New) The system of claim 43 wherein the central module selectively controls network services to the equipment as a function of the interrogation.

45. (New) The system of claim 1 wherein following a physical connection of a piece of equipment to the network via a cable the information about the equipment is communicated prior to normal network communication over the cable.

46. (New) The system of claim 1 wherein the altered current flow results from at least one change in voltage across the wires.

47. (New) The system of claim 1 wherein the altered current flow results from at least one change in resistance across the wires.

48. (New) The system of claim 1 wherein the altered current flow results from at least one change in impedance across the wires.

49. (New) The system of claim 1 wherein the wires within which the current flow is altered form a current loop through a piece of equipment and the flow of current through the current loop indicates a physical connection of the equipment to the network.

50. (New) The system of claim 1 wherein the information can be communicated even if a piece of equipment is powered off.

51. (New) The system according to claims 1, 19 - 48 or 49 wherein the network includes an Ethernet network and the cables are twisted pair Ethernet cables.

52 (New) The system according to claims 1, 19 - 48 or 49 wherein a piece of equipment is Ethernet equipment and normal network communication is BASE-T Ethernet.

53. (New) The system of claim 51 wherein the information can be communicated even if a piece of equipment is powered off.

54. (New) The system of claim 52 wherein the information can be communicated even if a piece of equipment is powered off.

55. (New) A system for conveying information on a network having objects that connect to the network by cables having a plurality of conductors therein, said system comprising:

a central module having at least one power source;

a separate cable connected between each object and the central module, each cable having a plurality of conductors therein;

a remote module utilized in conjunction with the central module to alter a flow of current within at least two of the conductors in the cable, the altered current flow conveying information about an object to the central module while the object is physically connected to the network via the cable.

56. (New) The system of claim 55 wherein a remote module is a device attached to an object.

57. (New) The system of claim 55 wherein the altered current flow includes two or more changes in the current flow.

58. (New) The system of claim 55 wherein the current flow is a DC current flow and the altered current flow includes at least one change in the magnitude of the DC current flow.

59. (New) The system of claim 55 wherein a remote module includes a transmitter and the central module includes a receiver.

60. (New) The system of claim 55 wherein the current flows through a center-tap of at least one isolation transformer.

61. (New) The system of claim 55 wherein a remote module is integrated into an object.

62. (New) The system of claim 61 wherein a remote module consists of one or more electrical components.

63. (New) The system of claim 55 wherein the central module is integrated into centralized network equipment.

64. (New) The system of claim 63 wherein the centralized network equipment is a hub.

65. (New) The system of claim 63 wherein the centralized network equipment is a patch panel.

66. (New) The system of claim 55 wherein the central module includes a second power source.

67. (New) The system of claim 55 wherein the information is utilized to selectively provide one or more electrical signals to one or more objects.

68. (New) The system of claim 67 wherein at least one electrical signal is a DC current signal.

69. (New) The system of claim 55 wherein the conductors within which the current flow is altered are the same conductors used for normal network communication.

70. (New) The system of claim 55 wherein the number of conductors within which the current flow is altered is four.

71. (New) The system of claim 55 wherein the information uniquely distinguishes an object.

72. (New) The system of claim 55 wherein the information identifies an electronic attribute of an object.

73. (New) The system of claim 55 wherein the information identifies a network attribute of an object.

74. (New) The system of claim 55 wherein the information identifies a physical attribute of an object.

75. (New) The system of claim 55 wherein the information identifies a physical configuration within an object.

76. (New) The system of claim 55 wherein the information is utilized to distinguish between different objects.

77. (New) The system of claim 55 wherein the information identifies one or more capabilities of an object.

78. (New) The system of claim 55 wherein the information identifies the port location of an object.

79. (New) The system of claim 55 wherein the information is utilized by a control circuit.

80. (New) The system of claim 55 wherein the information is utilized to provide a notification signal.

81. (New) The system of claim 55 wherein the central module interrogates an object for one or more predetermined characteristics.

82. (New) The system of claim 81 wherein the central module selectively controls network services to the object as a function of the interrogation.

83. (New) The system of claim 55 wherein following a physical connection of an object to the network via a cable the information about the object is conveyed prior to normal network communication over the cable.

84. (New) The system of claim 55 wherein the altered current flow results from at least one change in voltage across the conductors.

85. (New) The system of claim 55 wherein the altered current flow results from at least one change in resistance across the conductors.

86. (New) The system of claim 55 wherein the altered current flow results from at least one change in impedance across the conductors.

87. (New) The system of claim 55 wherein the conductors within which the current flow is altered form a current loop through a piece of equipment and the flow of current through the current loop indicates a physical connection of the equipment to the network.

88. (New) The system of claim 55 wherein the information can be conveyed even if an object is powered off.

89. (New) The system according to claims 55 - 86 or 87 wherein the network includes an Ethernet network and the cables are twisted pair Ethernet cables.

90. (New) The system according to claims 55 – 86 or 87 wherein an object is a piece of Ethernet equipment and normal network communication is BASE-T Ethernet.

91. (New) The system of claim 89 wherein the information can be conveyed even if an object is powered off.

92. (New) The system of claim 90 wherein the information can be conveyed even if an object is powered off.

93. (New) The system of claim 55 wherein an object is a network connector.

94. (New) A method for conveying information on a network having objects that connect to the network by cables having a plurality of conductors therein, said method comprising:

connecting a separate cable between each object and a central module, each cable having a plurality of conductors therein;

selecting a number of the conductors within a cable;

applying at least one power source to the selected conductors;

utilizing a remote module in conjunction with the central module to alter a flow of current within the selected conductors in the cable, the altered current flow conveying information about an object to the central module while the object is physically connected to the network via the cable.

95. (New) The method of claim 94 wherein a remote module is a device attached to an object.

96. (New) The method of claim 94 wherein the altered current flow includes two or more changes in the current flow.

97. (New) The method of claim 94 wherein the current flow is a DC current flow and the altered current flow includes at least one change in the magnitude of the DC current flow.

98. (New) The method of claim 94 wherein a remote module includes a transmitter and the central module includes a receiver.

99. (New) The method of claim 94 wherein the current flows through a center-tap of at least one isolation transformer.

100. (New) The method of claim 94 wherein a remote module is integrated into an object.

101. (New) The method of claim 100 wherein the remote module consists of one or more electrical components.

102. (New) The method of claim 94 wherein the central module is integrated into centralized network equipment.

103. (New) The method of claim 102 wherein the centralized network equipment is a hub.

104. (New) The method of claim 102 wherein the centralized network equipment is a patch panel.

105. (New) The method of claim 94 wherein the central module includes at least one power source.

106. (New) The method of claim 94 wherein the information is utilized to selectively provide one or more electrical signals to one or more objects.

107. (New) The method of claim 106 wherein at least one electrical signal is a DC current signal.

108. (New) The method of claim 94 wherein the selected conductors are the same conductors used for normal network communication.

109. (New) The method of claim 94 wherein the number of selected conductors is four.

110. (New) The method of claim 94 wherein the information uniquely distinguishes an object.

111. (New) The method of claim 94 wherein the information identifies an electronic attribute of an object.

112. (New) The method of claim 94 wherein the information identifies a network attribute of an object.

113. (New) The method of claim 94 wherein the information identifies a physical attribute of an object.

114. (New) The method of claim 94 wherein the information identifies a physical configuration within an object.

115. (New) The method of claim 94 wherein the information is utilized to distinguish between different objects.

116. (New) The method of claim 94 wherein the information identifies one or more capabilities of an object.

117. (New) The method of claim 94 wherein the information identifies the port location of an object.

118. (New) The method of claim 94 wherein the information is utilized by a control scheme.

119. (New) The method of claim 94 wherein the information is utilized to provide a notification signal.

120. (New) The method of claim 94 wherein the central module interrogates an object for one or more predetermined characteristics.

121. (New) The method of claim 120 wherein the central module selectively controls network services to the object as a function of the interrogation.

122. (New) The method of claim 94 wherein following a physical connection of an object to the network via a cable the information about the object is conveyed prior to normal network communication over the cable.

123. (New) The method of claim 94 wherein the altered current flow results from at least one change in voltage across the selected conductors.

124. (New) The method of claim 94 wherein the altered current flow results from at least one change in resistance across the selected conductors.

125. (New) The method of claim 94 wherein the altered current flow results from at least one change in impedance across the selected conductors.

126. (New) The method of claim 94 wherein the selected conductors form a current loop through a piece of equipment and the flow of current through the current loop indicates a physical connection of the equipment to the network.

127. (New) The method of claim 94 wherein the information can be conveyed even if an object is powered off.

128. (New) The method according to claims 94 -125 or 126 wherein the network includes an Ethernet network and the cables are twisted pair Ethernet cables.

129. (New) The method according to claims 94 -125 or 126 wherein an object is a piece of Ethernet equipment and normal network communication is BASE-T Ethernet.

130. (New) The method of claim 128 wherein the information can be conveyed even if an object is powered off.

131. (New) The method of claim 129 wherein the information can be conveyed even if an object is powered off.

132. (New) The method of claim 94 wherein an object is a network connector

133. (New) The system according to claims 16 or 17 wherein the network includes an Ethernet network and the cables are twisted pair Ethernet cables.

134. (New) The system according to claims 16 or 17 wherein a piece of equipment is Ethernet equipment and normal network communication is BASE-T Ethernet.